

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 23501

CSAH NO. 5

OVER THE

ROOT RIVER

DISTRICT 6 - FILLMORE COUNTY



PREPARED FOR THE
MINNESOTA DEPARTMENT OF TRANSPORTATION
BY
COLLINS ENGINEERS, INC.
JOB NO. 5221 (CEI 143)

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 23501, Piers 1 and 2, were found to be in good to satisfactory condition. A moderate to heavy accumulation of timber debris was observed at the upstream end and along the sides of both piers. Pier 2 exhibited vertical footing exposure and undermining with a maximum height of 1 foot and a horizontal penetration of 4.5 feet and steel H-pile exposure. The channel bottom at the bridge has overall experienced aggradation since the last inspection.

INSPECTION FINDINGS:

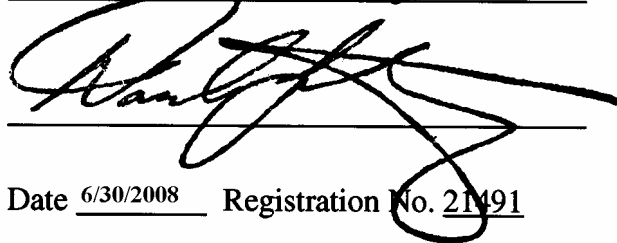
- (A) A heavy accumulation of 2 foot diameter and smaller timber debris was observed extending from the channel bottom to 2 feet above the waterline at the upstream end and along both faces of Pier 1.
- (B) A tree trunk, 1.5 feet in diameter (forked around pier), and some smaller timber debris was observed extending from the channel bottom to the top of the pier cap at the upstream end of Pier 2.
- (C) The footing was exposed all around Pier 2 with undermining and exposed steel H-piles observed from the midpoint along the east face, around the upstream southeast corner, and extending to the midpoint of the upstream end with a maximum height of 1 foot and 4.5 feet of horizontal penetration. The exposed steel H-piles were all sound with no notable deterioration.
- (D) Two vertical hairline cracks were observed at the midpoint of Pier 2 that extended from the top of the pier cap to 2 feet below the waterline on the east face and to the channel bottom on the west face.

RECOMMENDATIONS:

- (A) Remove the heavy accumulations of timber debris around Piers 1 and 2 to alleviate adverse effects for the channel bottom and the piers.
- (B) Scour rating indicates that bridge has the potential to be at greater risk for scour with further scour analysis required. Giving the undermining, consideration may need to be given for riprap to be properly designed and placed around the piers and in the scour/undermining areas to armor against further scour, unless further scour analysis indicates differently.
- (C) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

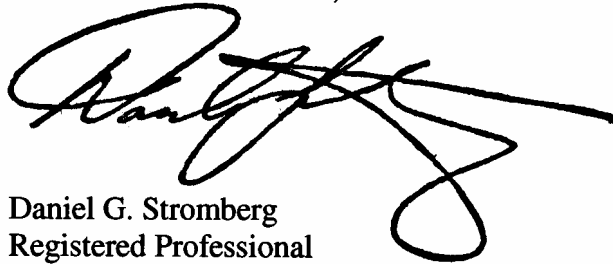
Daniel G. Stromberg



Date 6/30/2008 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.



Daniel G. Stromberg
Registered Professional
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 23501

Feature Crossed: Root River

Feature Carried: CSAH No. 5

Location: District 6 - Fillmore County

Bridge Description: The superstructure consists of three spans of continuous multiple steel stringers supporting a reinforced concrete deck. The superstructure is supported by two reinforced concrete abutments and two reinforced concrete piers. Both the abutments and piers are supported by steel H-piles. The piers are numbered 1 and 2 starting from the south end of the bridge.

2. INSPECTION DATA

Professional Engineer/Team Leader: Daniel G. Stromberg, P.E., S.E.

Dive Team: Clayton G. Brookins, Valerie Roustan

Date: October 25, 2007

Weather Conditions: Sunny, 60°F

Underwater Visibility: 3.0 feet

Waterway Velocity: Negligible/None

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1 and 2.

General Shape: The piers consist of a rectangular concrete shaft with rounded ends that supports a hammerhead pier cap and bears on a rectangular concrete footing founded on steel H-piles.

Maximum Water Depth at Substructure Inspected: Approximately 9.6 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the pier cap on the west end of Pier 2.

Water Surface: The waterline was approximately 9.3 feet below reference.
Waterline Elevation = 993.6.

5. NBIS CODING INFORMATION (Minnesota specific codes are used for 92B and 113)

Item 60: Substructure: Code 7

Item 61: Channel and Channel Protection: Code 4

Item 92B: Underwater Inspection: Code B/10/07

Item 113: Scour Critical Bridges: Code J/92

Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site.

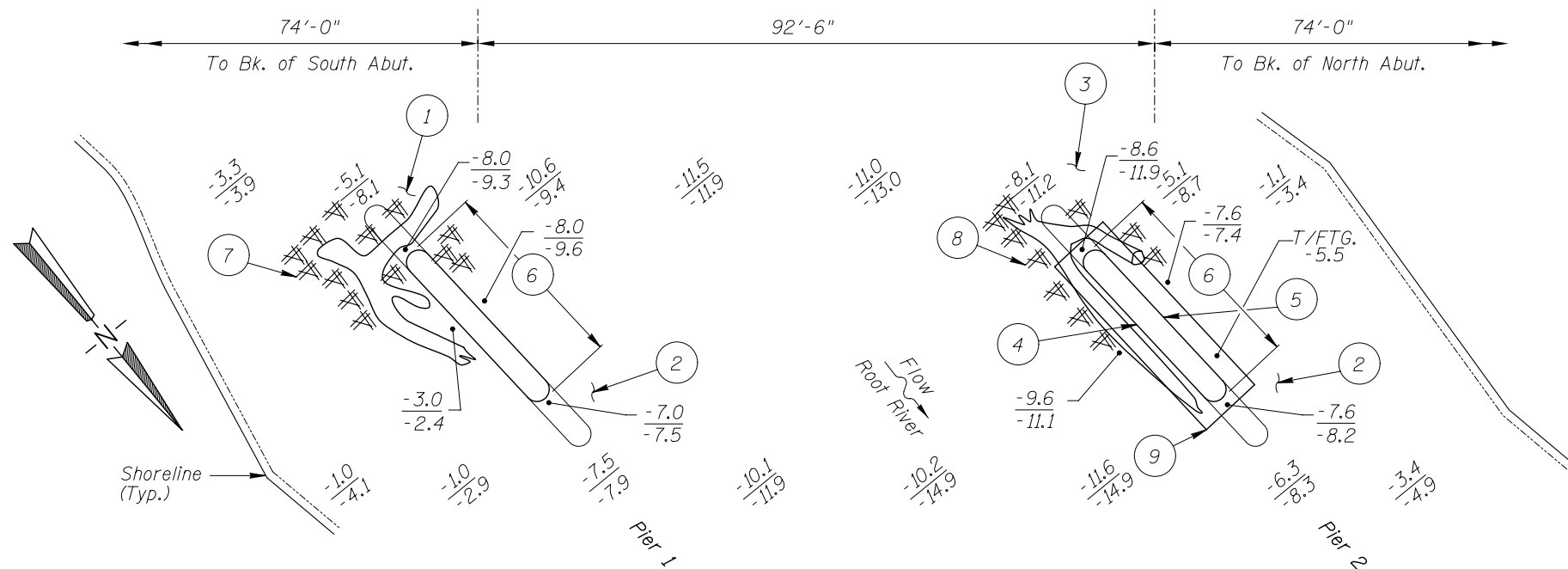
X (*) Yes _____ No * Possibly, further investigate scour / undermining.



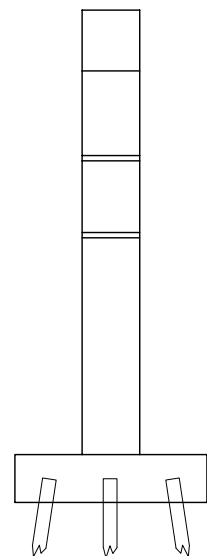
Photograph 1. View of Pier 1, Looking Southwest.



Photograph 2. View of Pier 2, Looking Southwest.



SOUNDING PLAN



TYPICAL END VIEW OF PIERS

GENERAL NOTES:

1. Piers 1 and 2 were inspected underwater.
2. At the time of inspection on October 25, 2007, the waterline was located approximately 9.3 feet below the top of the pier cap at the west face of Pier 2. This corresponds to a waterline elevation of 993.6.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.
4. Soundings were taken parallel to the bridge at 1/4 point intervals between the substructure units.

INSPECTION NOTES:

- 1 The channel bottom consisted of gravel and silt with up to 2 inches of probe rod penetration.
- 2 The channel bottom consisted of silty sand with up to 1 foot of probe rod penetration.
- 3 The channel bottom consisted of soft silt with up to 1.5 feet of probe rod penetration.
- 4 A vertical hairline crack was observed at the midpoint of Pier 2 that extended from the top of the pier cap to 2 feet below the waterline.
- 5 A vertical hairline crack was observed at the midpoint of Pier 2 that extended from the top of the pier cap to the top of the footing.
- 6 Light scaling was observed along all pier faces from 1 foot above to 1 foot below the waterline with a maximum penetration of 1/16 inch.
- 7 A heavy accumulation of 2-foot-diameter-and-smaller timber debris was observed extending from the channel bottom to 2 feet above the waterline at the upstream end and along both faces of Pier 1.
- 8 A 1.5-foot-diameter tree trunk and smaller timber debris was observed extending from the channel bottom to the top of the pier cap at the upstream end of Pier 2.
- 9 The footing was exposed at Pier 2 with undermining and steel H-piles observed from the midpoint along the east face, around the upstream southeast corner, and extending to the midpoint of the upstream end with a maximum height of 1 foot all along the undermined area, and 4 to 5 feet of horizontal penetration. The exposed steel H-piles were sound without any notable deterioration.

Legend

-2.0 Sounding Depth (10/25/07)
-5.2 Sounding Depth (10/3/02)

Timber Debris

Note:

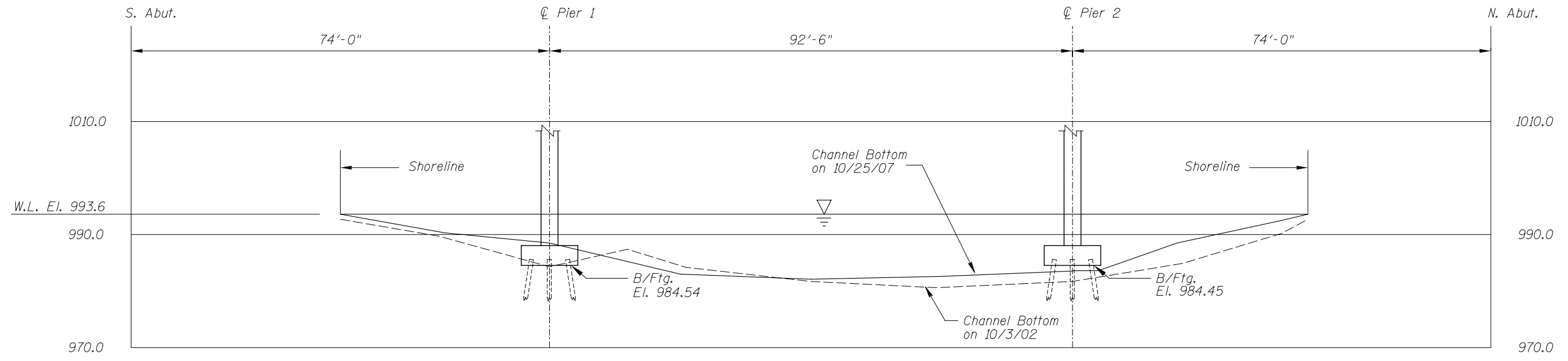
All soundings based on 2007 waterline location.

**MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION**

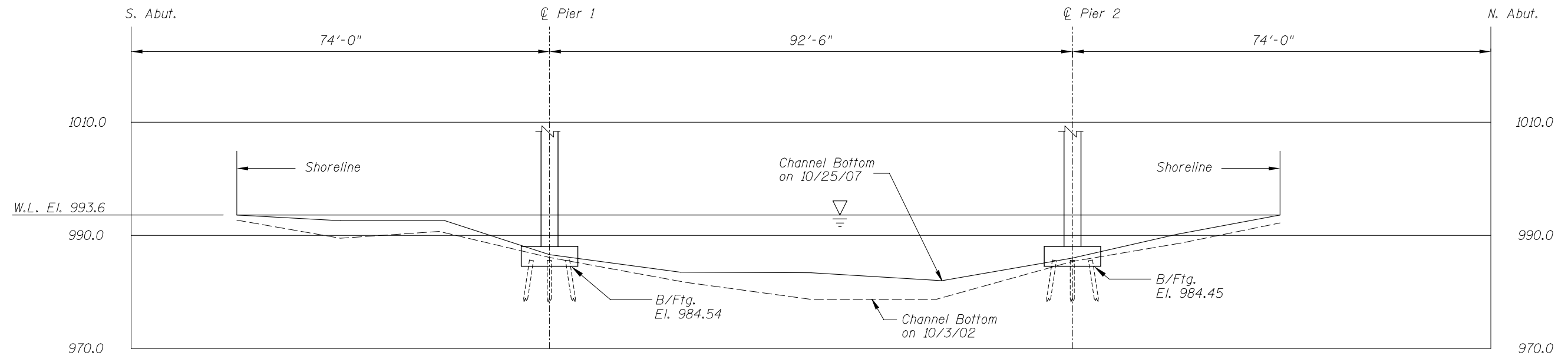
STRUCTURE NO. 23501
OVER THE ROOT RIVER
DISTRICT 6, FILLMORE COUNTY

INSPECTION AND SOUNDING PLAN

Drawn By: LJ	COLLINS ENGINEERS 123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com	Date: OCT. 2007
Checked By: VR		Scale: NTS
Code: 52210143		Figure No.: 1



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:
Refer to Figure 1 for General Notes.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 23501 OVER THE ROOT RIVER DISTRICT 6, FILLMORE COUNTY UPSTREAM AND DOWNSTREAM FASCIA PROFILES		
Drawn By: LJ	COLLINS ENGINEERS <small>123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: OCT. 2007
Checked By: VR		Scale: 1"=20'
Code: 52210143		Figure No.: 2

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES
DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc. DATE: October 25, 2007

ON-SITE TEAM LEADER: Daniel G. Stromberg, P.E., S.E.

BRIDGE NO: 23501 WEATHER: Sunny, 60°F

WATERWAY CROSSED: Root River

DIVING OPERATION: X SCUBA SURFACE SUPPLIED AIR
 OTHER

PERSONNEL: Clayton G. Brookins, Valerie Roustan

EQUIPMENT: Scuba, Scraper, Sounding Pole, Lead Line, Probe Rod, Camera

TIME IN WATER: 5:00 p.m.

TIME OUT OF WATER: 5:30 p.m.

WATERWAY DATA: VELOCITY Negligible/None

VISIBILITY 3.0 feet

DEPTH 9.6 feet maximum at Pier 2.

ELEMENTS INSPECTED: Piers 1 and 2

REMARKS: The concrete surfaces of the piers were in good condition with light scaling observed near the waterline and some vertical cracks on the pier shafts. A heavy accumulation of 2 feet diameter and smaller timber debris was observed extending from the channel bottom to 2 feet above the waterline at the upstream end and along both faces of Pier 1. A tree trunk, 1.5 feet in diameter (forked around pier), and smaller timber debris was observed extending from the channel bottom to the top of the pier cap at the upstream end of Pier 2. The footing all around Pier 2 was exposed with undermining and steel H-pile exposure from the midpoint at the east face, around the upstream southeast corner, and extending to the midpoint of the upstream end with a maximum height of 1 foot and 4.5 feet of horizontal penetration. The exposed piles were in good condition.

FURTHER ACTION NEEDED: X YES NO

Remove the heavy accumulations of timber debris around Piers 1 and 2 to alleviate adverse effects for the channel bottom and the piers.

Scour rating indicates that bridge has the potential to be at greater risk for scour with further scour analysis required. Giving the undermining, consideration may need to be given for riprap to be properly designed and placed around the piers and in the scour/undermining areas to armor against further scour, unless further scour analysis indicates differently.

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 23501
INSPECTORS Collins Engineers, Inc.
ON-SITE TEAM LEADER Daniel G. Stromberg, P.E., S.E.
WATERWAY CROSSED Root River

INSPECTION DATE October 25, 2007

NOTE: USE ALL APPLICABLE CONDITION DEFINITIONS AS DEFINED IN THE MINNESOTA RECORDING AND CODING GUIDE INCLUDING GENERAL, SUBSTRUCTURE, CHANNEL AND PROTECTION, AND CULVERTS AND WALL DEFINITIONS TO COMPLETE THIS FORM.

CONDITION RATING

UNIT REFERENCE NO.	UNIT DESCRIPTION	MAXIMUM DEPTH OF WATER	SUBSTRUCTURE						CHANNEL					GENERAL					
			PILING	COLUMNS, SHAFTS, OR FACES*	FOOTINGS	DISPLACEMENT	OTHER	OVERALL SUBSTRUCTURE CONDITION CODE*	SCOUR	EMBANKMENT EROSION	EMBANKMENT PROTECTION	OTHER (DRIFT/DEBRIS)	OVERALL CHANNEL & PROTECTION CONDITION	CONCRETE	STEEL	TIMBER	LOSS OF SECTION	PREVIOUS REPAIR OR MAINTENANCE	OTHER
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Pier 1	8.0'	N	7	N	9	N	7	8	7	8	5	5	7	7	N	N	N	N
	Pier 2	9.6'	N	7	7	9	N	7	4	7	8	6	4	7	7	N	N	N	N

*UNDERWATER PORTION ONLY

REMARKS: The concrete surfaces of the piers were in good condition with light scaling observed near the waterline and some vertical cracks on the pier shafts. A heavy accumulation of 2 feet diameter and smaller timber debris was observed extending from the channel bottom to 2 feet above the waterline at the upstream end and along both faces of Pier 1. A tree trunk, 1.5 feet in diameter (forked around pier), and smaller timber debris was observed extending from the channel bottom to the top of the pier cap at the upstream end of Pier 2. The footing all around Pier 2 was exposed with undermining and steel H-pile exposure from the midpoint at the east face, around the upstream southeast corner, and extending to the midpoint of the upstream end with a maximum height of 1 foot and 4.5 feet of horizontal penetration. The exposed piles were in good condition.

NOTES: ATTACH SKETCHES AS NEEDED, IDENTIFY REMARK BY REFERRING TO UNIT REFERENCE NO. AND REMARK NO.
USE GENERAL SECTION TO IDENTIFY OVERALL PRESENCE OF SPALLS, CRACKS, CORROSION, ETC.